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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,155	02/26/2002	Masaaki Katoh	259052002900	2654

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EXAMINER

HU, SHOUXIANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,155

Applicant(s)

KATOH, MASAOKI

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,8,10,11 and 26 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,8,10 and 26 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Accordingly to previous Office actions and the 06-30-2005 amendment, claims 1, 8, 10, 11 and 26 are pending in this application; and claims 1, 8, 10 and 26 remain active in this Office action.

Claim Objections

2. Claims 1, 8, 10 and 26 are objected to because of the following informalities and/or defects:

In claim 1, the term of "a recessed section formed through" needs further clarification, as it is not clear where such recess is formed, what it is formed of, and/or what is removed so as to form it.

In claim 1, the term of "one of either the N-type semiconductor layer or" should read as: --one of the N-type semiconductor layer and--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 8, 10 and 26, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. ("Chu"; US 2002/0117672 A1) in view of Okazaki (US 5,670,797; of record) and/or Ishizaki (US 2004/0051109).

Chu discloses a light-emitting diode (LED) comprising a LED chip (Figs. 1-6, especially Fig. 1B), including: a transparent substrate (107); a semiconductor layer (LED) with its first face on a surface of the substrate, which is inherently formed of an N-type semiconductor layer and a P-type semiconductor layer, wherein at least a portion in the vicinity of the PN junction interface therein is inherently rendered to be a light-emitting portion (such inherency is evidenced in Figs. 1A and 1C); a pair of electrodes, including a first electrode (112) and a second electrode (111 and/or 113); Chu further discloses (Fig. 1B) that the emitted light from the LED can be extracted through the transparent substrate (107) on the first face of the semiconductor layer (in LED) with a reflecting layer (110) formed of a conductive layer on the second face of the semiconductor layer (in LED), and that the semiconductor layer has a recessed section formed at a corner of the semiconductor layer with the second electrode (111 and/or 113) being formed at the recessed and/or exposed section of the semiconductor layer.

Although Chu does not expressly disclose that the LED chip can be vertically mounted on a printed substrate with its PN junction interface being perpendicular to the surface of the printed substrate, Okazaki teaches that such a vertically mounted LED chip is desirable for high reliability and easy mass production (see the vertical LED chip 44 in Fig. 8 (b); also see the abstract), wherein each of the two electrodes of the

vertically mounted LED is adjacent to the printed substrate (47) in order to form connections between the electrodes and the printed substrate.

Although Chu does not expressly disclose that the reflective conductive layer (110) can be formed of a metal thin film, one of ordinary skill in the art would readily recognize that a metal reflective thin film can be desirably formed for improving the optical efficiency and output of the light-emitting device, as readily evidenced in the prior art such as Ishizaki (see the meta reflective thin film 22 in the cover page figure);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the vertical LED mounting structure of Okazaki into the LED of Chu (Fig. 1B) with the reflective/conductive layer (110) therein being formed of a metal thin film, per the teachings of Ishizaki, so that a LED with high reliability and easy for mass-production along with enhanced optical efficiency and output would be obtained. And, the recessed section in the above collectively taught device would be naturally adjacent to the printed substrate therein, because the second electrode (111 and/or 113) in Chu is formed at the recessed corner and combined teachings require that both of the electrodes be adjacent to the printed substrate in order for them to form connections to the printed substrate.

Regarding claim 8, it is art known that a reflective metal thin film can commonly have a thickness of 100 nm or more, as further evidenced in Chu (see Paragraph 0029).

Response to Arguments

5. Applicant's arguments filed on 06-30-2005 have been fully considered but they are not persuasive. Examiner's responses to these arguments have been fully incorporated into the claim rejections above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
September 16, 2005



SHOUXIANG HU
PRIMARY EXAMINER